

03/11/20, 3:00PM

Module
Code:
ACHA 3000

Student
number:
2012643

Question 1

(i) $x^4 \times x^6 \times x$

$$= x^{4+6+1}$$

$$= \underline{x^{11}}$$

(v) $\sqrt{x} \times \sqrt{x}$

$$= x \times x$$

$$= \underline{x^2}$$

(ii) $2x^2 \times 3x^3 \times 2x$

$$= 12x^5 \times x$$

$$= \underline{12x^6}$$

(iii) $\frac{x^4 \times x^3 \times x^2}{x^9}$

$$= \frac{x^9}{x^9}$$

$$= \underline{1}$$

(iv) $(3x^2)^3$

$$= 3^3 \times x^6$$

$$= \underline{27x^6}$$

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Module
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$$(i) 15x - 2 = 12x + 9$$

$$= 15x - 12x = 9 + 2$$

$$= 3x = 11$$

$$= x = \frac{11}{3}$$

$$x = \underline{3.\dot{6}}$$

$$(ii) 3(7x - 2) = 6(x + 3)$$

$$= 21x - 6 = 6x + 18$$

$$= 21x - 6x = 18 + 6$$

$$= 15x = 24$$

$$(iii) \frac{5x+3}{4} = \frac{2x-1}{9}$$

$$= 9(5x+3) = 4(2x-1)$$

$$= 45x + 27 = 8x - 4$$

$$= 37x = -31$$

$$x = \underline{0.\dot{8}\dot{3}\dot{7}}$$

Question 3

$$(i) x^2 + 10x + 21 = 0$$

$$x^2 + 7x + 3x + 21 = 0$$

$$= (x+7)(x+3) = 0$$

$$x+7=0$$

$$x+3=0$$

OR

$$x = -7$$

$$x = -3$$

$$(ii) x^2 - 3x + 2 = 0$$

$$= (x-1)(x-2) = 0$$

$$x-1=0$$

$$x-2=0$$

OR

$$x = 1$$

$$x = 2$$

$$(iii) x^2 + 12x + 20 = 0$$

$$= (x+10)(x+2) = 0$$

$$x+10=0$$

$$x+2=0$$

OR

$$x = -10$$

$$x = -2$$

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Question 3 continued

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$$(iv) x^2 - 64 = 0$$

$$= (x+8)(x-8) = 0$$

$$x+8=0$$

$$x-8=0$$

OR

$$x = -8$$

$$x = 8$$

$$(v) 2x^2 + 9x + 10 = 0$$

$$= (2x+5)(x+2) = 0$$

$$2x+5=0$$

$$x+2=0$$

OR

$$x = -2.5$$

$$x = -2$$

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Question 4

$$x = \frac{-6 \pm \sqrt{6^2 - 4AC}}{2a}$$

$$14x^2 + 3x = 11$$

$$a = 14 \quad b = 3 \quad c = 11$$

$$= 14x^2 + 3x - 11 = 0$$

$$x = \frac{-3 \pm \sqrt{3^2 - 4 \times 14 \times (-11)}}{2 \times 14}$$

$$x = \frac{-3 \pm \sqrt{9 + 616}}{28}$$

$$x = \frac{-3 \pm 25}{28}$$

$$x = \frac{-3 + 25}{28}$$

~~Th. = 10.750 kg. 17. Dec. 1961~~

$$x = \underline{0.79} \text{ (to 2 decimal places)}$$

OR

$$x = \frac{-3 - 25}{28}$$

$$x = -1$$

Question 5

$$\begin{aligned} 5x + 3y &= 39 \\ 8x - 2y &= 42 \end{aligned}$$

$$\begin{aligned} x &= 6 \\ y &= 3 \end{aligned}$$

$$8x = 42 + 2y$$

$$x = \frac{21}{4} + \frac{1}{4}y$$

$$\therefore 5 \left(\frac{21}{4} + \frac{1}{4}y \right) + 3y = 39$$

$$\frac{105}{4} + \frac{5}{4}y + 3y = 39$$

$$105 + 17y = 156$$

$$17y = 156 - 105$$

$$17y = 51$$

$$\therefore y = 3$$

$$x = \frac{21}{4} + \frac{1}{4} \times 3$$

$$x = \frac{21}{4} + \frac{3}{4}$$

$$\therefore x = 6$$

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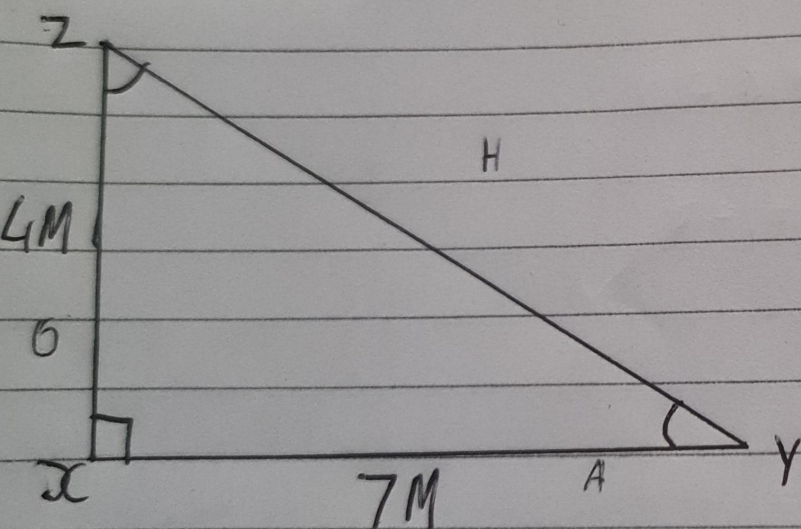
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Question 6

$$\begin{aligned}
 & 5(2x^2 - y^2) - x^2(x^2 - y) - x^2y - x^4 \\
 &= 10x^2 - 5y^2 - x^4 + x^2y - x^2y - x^4 \\
 &= 10x^2 - 5y^2 - 2x^4
 \end{aligned}$$

Question 7

$$\begin{aligned}
 \text{Angle } Y &= 29.74^\circ \\
 \text{Angle } Z &= 60.26^\circ \\
 \text{Length of } YZ &= 8.06 \text{ M}
 \end{aligned}$$

$$\text{Angle } Y = \tan(Y) = \frac{4}{7}$$

$$\tan(Y) = 0.5714285714$$

$$Y = \tan^{-1}(0.5714285714)$$

$$Y = 29.74^\circ$$

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Question 7 continued

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Angle Z

$$Z = 180^\circ - 90^\circ$$

$$= 90^\circ - 29.74^\circ$$

$$Z = \underline{60.26}$$

Length of YZ

$$YZ = \sqrt{a^2 + b^2}$$

$$YZ = \sqrt{4^2 + 7^2}$$

$$YZ = \underline{8.06M}$$

Question 8

(i) $\sqrt[3]{x}$

$$\sqrt[3]{x} = x^{\frac{1}{3}}$$

(ii) ~~both~~ 1

$$1 = \text{both } 1^x$$